

## ABSTRACT

**[0029]** A novel and inexpensive excitation circuit based on a single switch and a single source drives helium-free TEA CO<sub>2</sub> lasers, mini to conventional types, providing low divergent output. By varying the partial pressure of either CO<sub>2</sub> or N<sub>2</sub>, the duration (FWHM) and the peak power of the laser pulse (for a system with active volume about 70 cc) is made to vary by a factor of about 7 and about 5 respectively. The fact that expensive and scarce helium is not a constituent of the laser gas mixture makes it an ideal system for high repetition rate operation as the gas re-circulatory loop consisting of the heat exchanger and the catalytic re-converter, a mandatory requirement for conventional systems to recycle helium gas, can be readily dispensed with here. This laser can be used wherever a TEA CO<sub>2</sub> laser with conventional gas mixture containing helium is used.